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Stairway to Excellence Country Report: CROATIA

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Abstract

In the frame of the Stairway to Excellence project, complex country analysis was performed for the EU MS that joined the EU since 2004, with the objective to assess and corroborate all the qualitative and quantitative data in drawing national/regional FP7 participation patterns, understand the push-pull factors for FP7/H2020 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed by the IPTS/KfG/S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on analytical framework developed by IPTS.

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EXECUTIVE SUMMARY

The governance of the R&I systems has gone through significant changes since mid-2013, primarily due to reforms in pursuit of scientific excellence, innovation efficiency, reduction of national resources for R&I and increasing the absorption of ESIF. A majority of traditional and long-lasting funding schemes, and institutions have been significantly reduced, terminated or transformed. There is not much synergy and connection among the programmes funded by these different resources since their strategic goals and objectives are often rather different. Strategy for Innovation Encouragement of the Republic of Croatia 2014-2020 is being implemented very slowly, whereas Smart Specialisation Strategy still needs to be adopted. Moreover, governance processes related to R&I suffer from the lack of coordination and efficiency, as well as from instability of administrative structures and high administrative burdens. That leads to increased risks and costs for R&I performers which apply for funding and implement projects. Despite demotivating factors for participation in ESIF and H2020 activities, most R&I performers realise that their future development depends upon taking advantage of EU sources of funding. Moreover, budget cuts, re-accreditation process of research institutions and the new rules for career progress provide impetus for more participation, which can also create more synergies.

However, if these opportunities are to be utilised, many improvements both at the policy level and at the level of specific organisations are needed. The recommendations below tackle specific sectors.

In research and innovation sector, policies should be designed to ensure the preservation of the national science base and fundamental research in the public research sector in order to provide a basis for recruitment of excellent scientific groups and scientists. Increase in the number of researchers, as well as investments in R&I in the business sector should be further facilitated and encouraged through new and/or improved policy measures. Science policy measures should be maintained and further developed, especially in terms of stronger emphasis on the involvement in EU projects as a criteria of scientific institutions performance and career progress of researchers. Comprehensive and transparent system of scientific promotion, employment and career development should be established in order to single out top scientists, with the emphasis on post-doctoral students, as a way of enabling their employment and development of their career in Croatia, rather than abroad.

Networking of researchers should be initiated to encourage perspective researchers and research organisations to participate in H2020/ESIF project applications, preferably through organisation of info days, brokerage events and similar measures. Funding necessary for successful project applications development (e.g. preparatory meetings) and participation at international brokerage events for identification of potential project partners should be facilitated and co-financed. In addition, publication of public calls for project applications should be planned more carefully to ensure that applicants have enough time to prepare successful project applications. Emphasis should also be put on finding solutions to overcome the effect of late entry in FP/H2020 programmes, especially when it comes to acquiring necessary skills and capacities in project management and financing e.g. through creation of the common offices for EU projects, lobbying in the EU, exchange of experiences and best practices, etc. Further efforts should be invested in regulation of land and property registers, since unresolved property registration issues are a common obstacle in project applications of HEIs and PROs.

In order to facilitate greater participation of the business sector in ESIF, a comprehensive evaluation of previous public calls should be conducted, in order to eliminate unnecessary documentation required by the companies which hinders or slows down project application. A wider pool of business sector participants (SMEs in particular) should be encouraged to gain first experience in R&D projects co-financed through ESIF. Public procurement procedures in EU-funded projects should be improved, simplified and accelerated, possibly by using PRAG as a good practice example for improving national regulations. In addition, all procedures and items associated with EU-funded projects should be treated as a priority and resolved in a short notice. Delays in final payments should be eliminated through increasing the capacities and competencies of contracting authorities.

Public administration sector should be a subject of analysis in which all state administration departments in charge of the EU-funded projects should be identified and their functioning evaluated, in order to eliminate

all overlaps in their obligations and to facilitate their communication and coordination. The analysis of the non-eligible costs on IPA projects suggest that grant and funding contracts should be more standardized and transparent in order to minimize the arbitrariness and uncertainty of users and contracting bodies regarding financial issues. Both the public administration and the ESIF beneficiaries should be well-educated and familiar with the public calls and rules of project implementation. Public administration should find a way to consolidate fragmented research resources for the needs of ESIF projects: to integrate research community internally-within research community, and externally – with the business sphere to implement ESIF projects.

Stakeholders from different sectors on national, regional and local levels should participate more actively in creation of ESIF projects to secure the implementation of the principle of entrepreneurial discovery process and realisation S3 priority areas. This requires much more coordination and guiding actions as well as effective communication and an exchange of information regarding strategic plans and operational implementation between managing authorities, ministries, agencies, contracting bodies and other stakeholders.

Acknowledgements

An essential step in the creation of this report was the collection of information and suggestions of researchers and other stakeholders in the FP/IPA and H2020/ESIF projects. They enable this report by sharing their thoughts and experience with us and we wish to warmly thank to all who has responded to the questionnaires and interviews

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1 INTRODUCTION

Background of the “Stairway to Excellence” project

The European Commission Framework Programme (FP) for research and technology development has been vital in the development of European knowledge generation. However, there is considerable disparity across EU countries and regions in terms of FP participation and innovation performance.

Horizon 2020 has continued to provide funding on the basis of excellence, regardless of geographical location. However, it has also introduced novel measures for "spreading excellence and widening participation" by targeting low Research & Innovation (R&I) performing countries - most of whom are eligible for innovation funding under Cohesion Policy for the period 2014-2020.

In addition, the new regulations for ESIF aim to use funds more effectively to build regional/national excellence and capacities. By doing so, the key funding sources (ESIF and Horizon 2020) can complement one another along the entire innovation process.

Objective of S2E

The Stairway to Excellence (S2E) project is centred on the provision of support to enhance the value of the key European Union (EU) funding sources for research, development and innovation: European Structural and Investment Funds and Horizon 2020 but also the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME), Erasmus+, Creative Europe, European Union Programme for Employment and Social Innovation ("EaSI") and the digital services part of the Connecting Europe Facility by actively promoting their combination. The project has two main objectives, namely:

- Providing of assistance to regions and countries that joined the EU since 2004 in closing the innovation gap, in order to promote excellence in all regions and EU countries;
- Stimulating the early and effective implementation of national and regional Smart Specialisation Strategies.

Main purpose of the document

In the frame of the project, complex country analysis is performed for all 13 EU MS with the objective to assess and corroborate all the qualitative and quantitative data in drawing national/regional FP7 participation patterns, understand the push-pull factors for FP7 participation and the factors affecting the capacity to absorb cohesion policy funds. This report articulates analysis on selected aspects and country-tailored policy suggestions aiming to tackle the weaknesses identified in the analysis.

The report complements the complex qualitative/ quantitative analysis performed the IPTS/KfG/S2E team. In order to avoid duplication and cover all the elements required for a sound analysis, the report builds on analytical framework developed by JRC-IPTS.

2 QUALITY OF THE GOVERNANCE

The governance of the R&I systems has gone through significant changes since mid-2013, primarily due reforms in pursuit of scientific excellence, innovation efficiency, reduction of national resources for R&I and increasing the absorption of European Structural and Investment Funds 2014-2020 (ESIF). A majority of traditional and long-lasting funding schemes and institutions at the national level have been significantly reduced, terminated or transformed.

One of the critical problems of the national research system is a lack of resources for competition based fundamental research, required to preserve scientific excellence needed for competition within H2020. It is known that the GERD in Croatia is very low¹ (€354m) or 0.81% of the GDP (Eurostat, 2015). This is only €83.2 per inhabitant, or more than six times lower than the EU 28 average of €539. 2). However, the total funds for competition-based basic research funded by the Croatian Science Foundation (CSF), which is the only such source in Croatia, amounts to €13m while additional funds of €6.5m are allocated by MSES for institutional performance-based funding directly to institutions.

The number of researchers is rather small and stagnant. Over the last five years the number of researchers oscillated from 6,500 to 7,000 researchers (FTE) – or 0.43% of total employment (compared to EU-28 average of 0.79 %). Croatia has entered the second year in which the process of rejuvenation of research community through a system of funding junior researchers by MSES has been stopped; it barely survives through a small number of doctoral students funded by the CSF (around €4m in 2014). This will likely lead to a gap in human resources for research and innovation.

It is also viewed that many young scientists leave Croatia due to the lack of opportunities or because they have not obtained a research post after finishing their doctoral studies. The criteria for promotion of researchers are not selective enough to sort out the top scientists and the level of academic mobility is low. Although the amount of national funds remained more or less the same compared to the previous period, the funds are distributed in a different way due to the substantial reforms of research funding in the second half of 2013, which coincided with the accession of Croatia into the EU on 1 July 2013.

National funding based on a large number of small research projects funded by MSES was substituted by a smaller number of larger projects funded by the CSF). The remaining resources have been allocated for performance-based institutional funding which was expected to compensate the costs of researchers without project funds. The results of these reforms are rather successful since institutional funding in combination with the process of re-accreditation of the PROs and HEIs (as a part of quality assurance system) contributed significantly to strengthening the financial accountability and responsibility of the public research organisations. Many PROs decided to develop new strategies and action plans to achieve better quality of research, scientific production, international visibility, etc. for the next round of re-accreditation. However, research funds have proved to be insufficient² to cover all needs of researchers especially in natural, medical and technical sciences. Many excellent research groups that could significantly contribute not only to research but also to innovation, technology transfer and development of key enabling technologies were left without sufficient funds to implement their research activities. Equipment maintenance is insufficient, whereas new equipment purchases often depend on ESIF and H2020 projects.

Receiving CSF funds has become increasingly difficult and competitive. The evaluation procedures are commonly perceived as non-transparent, whereas project implementation is subjected to rigorous procedures without the necessary flexibility (e.g. changes in research staff).

The projections of the state budget foresee further decrease in the budget for R&I in 2015 and 2016. PROs and HEIs are encouraged to seek funds from programmes financed by the ESIF or H2020. Since 2014 there have been five main resources for funding R&I activities: national, FP/H2020, Structural Funds (SF) 2007-2013, ESIF (still not used) and the World Bank loan used for the Second Science and Technology Project³ (STP II) (Table 1 and Figure 1). The problem with Horizon 2020 is lagging behind in terms of participation in

¹ the fourth lowest, after Greece, Latvia and Romania

² Some PROs decided to cover, for example, only a part of costs for scientific conferences in order to allow mobility for as many researchers as possible

³ <http://public.mzos.hr/Default.aspx?sec=3525> (Last access 9/6/2015)

internationally successful research networks; moreover, many HEIs and PROs do not have sufficient management competences for participation in and coordination of H2020 projects which are regularly large consortium projects (see Chapter 4). Given the low acceptance rate of FP/H2020 projects, the only viable strategy would be to develop a strong project pipeline in collaboration with a wide network of partners. However, many organisations do not have sufficient resources and leadership to follow that path. On the other hand, the utilisation of SF/ESIF suffers from inadequate national coordination and inefficient administration.

Despite the fact that ESIF 2014-2020 became available to Croatia in July 2013, they have not been used for funding research activities so far. The detailed plan for using this funds has been envisaged within the Operational Programme "Competitiveness and Cohesion" (OPCC) 2014-2020 accepted by the European Commission in December 2014 (OPCC, 2014).

Table 1: Funds for R&I activities in Croatia since 2014

Administrative body	Type of resources	Programmes	Funds in €m	Time horizon
MSES	National	Performance based institutional funding;	6.5	Per year (2014-2016)
MSES	National	Centers of excellence	0.26	Per year (2014-2017)
MSES	SF 2007-2013 (OPCC)	Strengthening capacities for research, development and innovation	9.43	For the call in 2014
MSES	SF 2007-2013 (OPHR)	Research scholarships for professional development of young researchers and post-doctoral students	4.9	For the call in 2014
MSES	Marie Curie FP7-PEOPLE-2011-COFUND	Programme NEWFELPRO	7	2013-2017
CSF	National	Competition based projects in basic research (single source in Croatia);	13	2015
CSF	National	Partnership in research	1.9	2015
CSF	National	Young Researchers' Career Development Project – Training of Doctoral Students	3.9	2015
HAMAG-BICRO	STP II (World Bank loan)	<ul style="list-style-type: none"> • Innovation programmes: <ul style="list-style-type: none"> – RAZUM; – IRCRO; – PoC (Proof of Concept) – TTO (technology transfer offices) • Assistance for absorption of ERDF 	20	2013-2020
European Commission	FP/H2020	Various projects	n.a.	2014-2020
MSES/MoE	ESIF	OPCC- PA1 -Strengthening the economy by applying research and innovation	664	2014-2020

There is not much synergy and connection among the programmes funded by these different resources since their strategic goals and objectives are often rather different, especially between previous FP and IPA (Instrument for pre-Accession Assistance) projects. The synergy with SF 2007-2013 is almost non-existent since only 19 research projects have been approved in December 2014. A certain exceptions are STP funds for preparation activities for large research infrastructure projects which are to be co-financed through ERDF (e.g. O-ZIP project at the Ruđer Bošković Institute - RBI). However, they mainly address consulting services (e.g. feasibility studies, detailed design etc.). Due to complex implementation of STP II, coupled with complex procurement, contracting and project implementation, these activities are time consuming.

Croatia has set up the necessary administrative and institutional framework for FP/H2020 which consists of the National Contact Points and members on Horizon 2020 programme committees. The national portal for H2020 programme⁴ was launched in December 2013.

The Croatian Government has initiated the use of ESIF for the period 2014-2020 in April 2012. The programming process (development, planning and programming of documents) was coordinated by the Ministry of Regional Development and EU Funds (MRDEUF) which remains the central government body in charge for coordination and management of ESIF⁵.

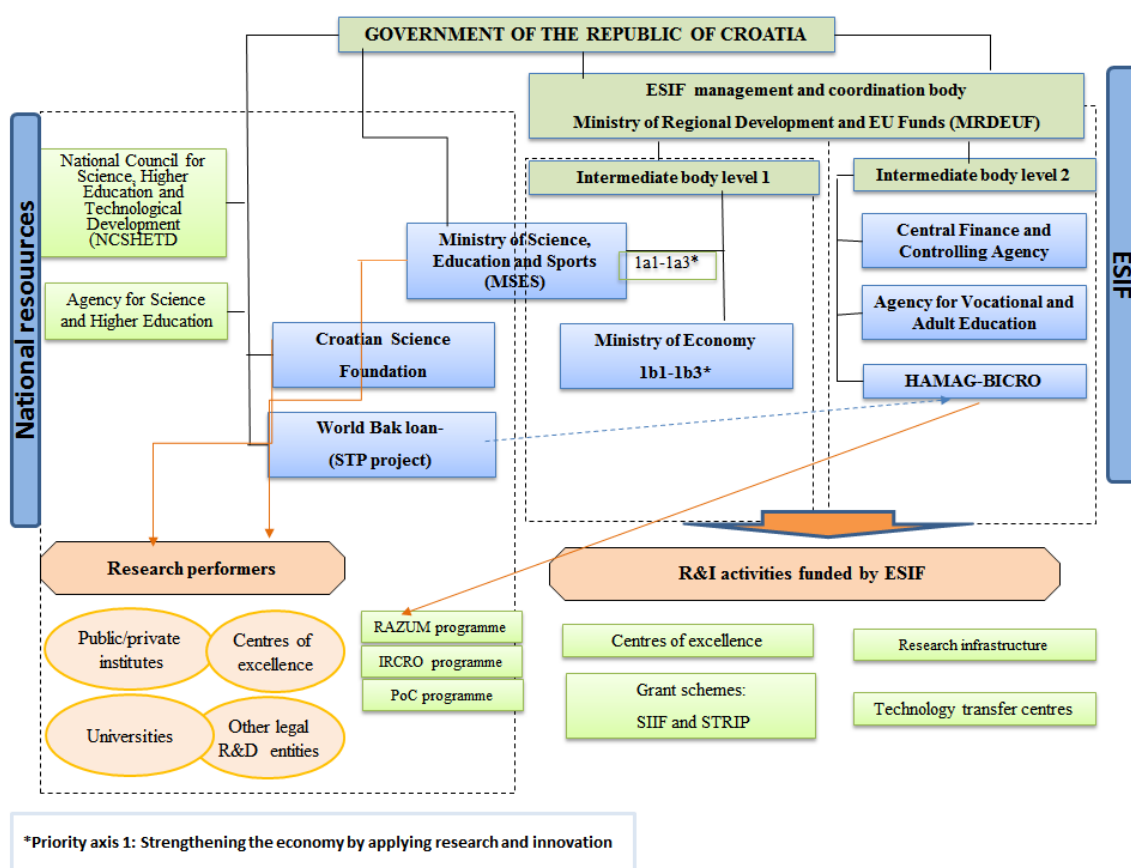
The institutional framework consists of the bodies that are involved in the management and use of IPA and thus acquire the necessary knowledge and experience.

- **Managing Authority is MRDEUF** which is responsible for the overall implementation of the OP;
- **Intermediate body level 1** are line ministries responsible for the realization of the certain priority axis;
- **Intermediate Body level 2** are government agencies and other bodies responsible for the managing and implementation of the individual programmes;
- **Coordination Body** is MRDEUF;
- **Certifying Authority** is the Ministry of Finance;
- **Audit Authority and Independent Audit Authority** is the Agency for Audits of the Implementation of EU Programmes.

⁴ <http://www.obzor2020.hr/> (Last access: 9/6/2015)

⁵ By the Decision of the Government on 6 September 2012 (Official Gazette 102/2012) an interdepartmental Steering Committee for the preparation of programming documents for the financial period of the EU 2014-2020 was established which was responsible for the preparation of program documents, as the basis of the use of funds from the EU structural and investment (ESI) funds. The Commission approved the Partnership Agreement, 30 October 2014, paving the way for the use of ESIF

FIGURE 1: ORGANOGRAM – GOVERNANCE OF R&D FUNDS



MSES, as the line ministry for research and education, participates as an Intermediate body level 1 within the Priority axis 1 (PA 1) of the OPCC (Strengthening the economy by applying research and innovation) for the Specific objectives 1a1-1a3 (Increased capacity of research, development and innovation) while the remaining Intermediate body level 1 for PA 1 for the Specific objectives 1b1-1b3 is the MoE (Figure 1).

However, most researchers are not familiar with these structures and their functioning. Similar lack of understanding of “how the whole thing works” was within the previous IPA programmes. Participation in both the IPA and FP/H2020 as well as in ESIF is characterized by “learning by doing” by researchers and HEI/PRO management, since they tend to react to specific issues and calls for proposals and cope with the practical problems as they arise. By contrast, when it comes to FP/H2020 programmes, there are different information events, seminars and workshops which provide basic information. However, in this case the opportunities are wider, whereas development and implementation of projects requires even more skills and competencies. Although the governance of FP/H2020 and SF 2007-2013 funds differs significantly due to the different strategic aims of the programmes and a level of responsibilities of national bodies, the following obstacles inherent to administration can be considered as common in both cases:

- The RIS3 which is important for strategic orientation of research has still not been adopted;
- Duplication of similar functions in ministries without synergy - different ministries have the same units and offices related to projects but rarely communicate to each other; there is also weak horizontal and vertical flow of information between ministerial bodies, NCPs, scientific managers and LEARs at HEIs and PROs;
- Instability of administrative structures both in terms of governance structures and responsibilities of specific institutions and in terms of frequent changes of staff responsible for the programmes at all levels of administration (ministries, managing bodies, local authorities, contract bodies, etc.) over the

last five years; the new personnel need to master the skills for managing the programme and establishing good communication with a wide network of stakeholders; there is a constant learning from scratch instead of sophistication and upgrading of administrative competencies; the study about implementing of IPA projects (PJR, 2014) reveals that one IPA project is monitored from start to finish by 2.40 persons from contracting body; it is a fact which cannot be considered satisfactory;

- Inadequate understanding of research activities by administration – administrative staff in ministries and agencies mainly involves persons who have not participated in research projects so they have difficulties in understanding practical problems encountered by researchers in their work;
- High administrative burdens associated with the project development and implementation – including issues related to project documentation, regulations, reporting, public procurement and property register and cadastre (see Chapter 3) – this often leads to delays and increases costs and risks of particular projects;
- These problems culminate in a very slow implementation of large research infrastructure projects e.g. BIOCentre (Biosciences Technology Commercialisation and Incubation Centre) project was approved by the EC in 2010, and it will finally be completed in mid-2015.

Bureaucratic burdens and deficient administrations are more pronounced in programmes related to ESIF than H2020. It is rather expected since ESIF is a novelty in science policy and places a higher burden on the national administration which is responsible for its governance. The following problems can be identified:

- some officials have vague ideas about new programmes which should be initiated within ESIF; they are lacking strategic orientation and vision when initiate new programmes and consequently change the regulations, the “rules of the game”, application documentation, delay calls, delay payments etc.; such a situation leads to uncertainties, increases risks for final beneficiaries, which produces dissatisfaction of potential and actual applicants and research managers at R&I performers;
- A relatively small number of SF 2007-2013 projects which involve cooperation between research institutions and enterprises is due to the bureaucratic requests which companies should meet for participation in the project; this appeared as a problem even for rather good companies (e.g. Podravka, Pliva, Atlantic Group) which were forced to abandon their participation in R&I projects;
- Entrepreneurs and research institutions without limited or no experience in science-industry cooperation have difficulties in searching for project partners; no assistance is provided;
- During project implementation, supervisory authorities (e.g. CFCA and ministries) often provide insufficient or even contradictory interpretations;
- disbursement of project funds is usually late, which slows down work on project, procurement of equipment and the like (“you are in truly problems if you won the project”);
- evaluation procedures in some IPA programmes were considered non transparent;
- call for proposals should be more coordinated in timing especially if synergy of funds is expected; a suggestion is to have more permanent calls in order to avoid time lags and overlapping of the calls and enable applications to prepare project proposals in continuum with no pressure of deadlines;

Table 2: SWOT analysis of the governance of the R&I system with a focus on the governance of ESIF

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Initiation of the reforms in funding research activities and evaluation (re-accreditation) of HEIs and PROs that take account the participation in H2020/ESIF • Existence of a core of high-quality research groups who are able to successfully apply for EU and ESIF tenders; • The existence of a network of NCPs and research managers in scientific institutions needed for H2020; • Initiation of the indicative list of large infrastructure projects for ERDF and beginning the realization of the selected group of projects; • Setting up the governance structure for ESIF 	<ul style="list-style-type: none"> • Insufficient national funds for maintaining the national science base (especially in natural, medical and technical sciences) needed for producing scientifically excellent research groups and researchers competent for EU and ESIF projects; • Insufficient number of research managers in scientific institutions; • Insufficient motivation and focus of scientists to ESIF due to bureaucratic burdens, fragmentation of human resources (lack of networking), difficulties in finding business partners and management capabilities for coordination of large projects; • High and ambiguous bureaucratic burdens associated with the projects implementation; • Non-transparent public procurement procedures and unregulated property and land register (cadastre); • Gaps in competence and coordination of state administration for governance of the ESIF; • The fragmentation and sometimes duplication of offices at the ministries for ESIF projects; • Lack of coordination and weak horizontal and vertical flow of information between the offices, NCPs and scientific managers; • Lack of defined rules and legal framework for project management of ESIF; • Institutions often have insufficient funds for project preparation so they postpone or give up projects

POSSIBILITIES	THREATS
<ul style="list-style-type: none"> • Creating the highly functional offices (perhaps centralized at the level of several PROs) to provide specific assistance in regards to financial, legal, public procurement, and other issues; • Intensifying activities to inform researchers about possibilities and functioning of ESIF; • Rationalization and connecting of the offices for EU projects in various ministries in order to coordinate programmes which can lead to synergies between research and business sphere; • Linking researchers and companies in joint projects using thematic calls (see Chapter 7); • Creation of funds in the PRO and HEIs to prepare H2020 And ESI projects 	<ul style="list-style-type: none"> • Insufficient (low and decreasing) number of researchers needed for putting the large research infrastructure into work; • Possible gap of young generation of researchers due to the lack of funds for PhD students and prohibition of employment of young researchers; • The possibility of scientific career progress even to the highest scientific grades without international references • Low or unknown number (and profile) of companies/entrepreneurs needed for activating entrepreneurial discovery process of S3; • Low technology capacities of companies and a lack of interest for research activities and cooperation with HEIs and PROs; • Continuation of institutional instability and changes in governance and administration staff due to the forthcoming general elections;

3 FACTORS THAT SUPPORT OR LIMIT THE NATIONAL PARTICIPATION IN R&D CALLS FUNDED BY SF/ESIF

There is a general perception that research community have not learnt a lot from IPA as a pre-accession instrument for ESIF due to their relatively late and low-intensity involvement in the IPA projects. Within the Operational Programme Regional Competitiveness 2007 – 2013, in addition to the BIOCentre⁶, only 24 projects were supported through the Science and Innovation Investment Fund.

One of the problem of the IPA programme was pre-financing which led to projects being abandoned up since institutions did not have resources for pre-financing while information how to resolve this problem was missing in the initial stage.

The next problem is research irrelevance of most IPA projects since grant schemes were mainly targeted at stakeholders different from research institutions (companies, NGO sector, local authorities, technology centres, etc.) and they were not perceived by researchers as significant source of results which could be important for research excellence and their career progress. Researchers participated in those projects mainly when they had previous cooperation with the project applicant.

There was only one programme aimed for research community – the Science and Innovation Investment Fund – SIIF targeted at capacity-building for technology transfer and commercialization of research. Due to this orientation, the programme turned out to be not very attractive for the majority of researchers (altogether 24 projects were funded).⁷

This has partly changed recently within SF 2007-2013 since they offer special programmes intended for research community such as, scholarships for doctoral students and grant schemes for research activities". Only one call related to research activities was launched in 2014 funded by the SF 2007-2013 which resulted in funding of 19 projects within the call Capacity-building in research, development and innovation. There were more project submissions which have not met various administrative or evaluation requirements.

One of the challenges of the IPA and ESIF research-oriented grant schemes is their strong focus towards cooperation with the business sector and towards large and complex projects in terms of financial resources, infrastructure prerequisites and number of stakeholders.

The first challenge forces researchers to face a problem of identification of adequate project partners (companies) while the second challenge revealed that majority of scientific community is fragmented, lacking networking and connections. Ordinary researchers and research groups are usually not able to apply for such projects since they are lacking projects partners from both business and research sectors. The actions and instruments for consolidation and concentration of research capacities are needed.

From the legal and administrative point of view, the most important obstacles related to IPA/ ESIF projects are identified up to now in the following:

- Procedures of **public procurement** which are slow and often involve appeals of unsuccessful bidders, which then create significant delays in project implementation; in IPA public procurement was performed in accordance with PRAG regulations, while in ESIF the national procedures are followed; generally speaking, the process of public procurement lasted for over 90 days (PJR, 2014);
- Many PROs and HEIs have problems with **unregulated property and land register (cadastre)** which completely block projects which are otherwise at an advanced stage of preparation.

⁶ <http://www.regionalna-konkurentnost.hr/default.aspx?id=3612> (Last access: 8.6.2015.)

⁷ The best research project of SIIF was the preparation of marasca cherries in food industry coordinated by the Faculty of food technology and biotechnology. The largest SIIF project is the BISTEC projects– Building innovation support through efficient cooperation network founded on the previous SIIF project [Technology mapping at the University of Zagreb](#), (2010.-2012.) aimed at mapping of five faculties of the University of Zagreb. The total value of the BISTEC project for 2013-2015 s around €0.8m. The project partners are University of Rijeka, 10 faculties of the University of Zagreb and 10 supporting institutions.

The delays in final payments also create problems, which can disturb the cash flow of smaller institutions like technology centres. According to the analysis (PJR, 2014), the average time from submission of the final report to the allocation of final payments is 11 months and 23 days. Financing gap users bridged or by own resources (69%) or by borrowing or loans (31%). Since the analyses of research projects funded by IPA are very scarce, the main obstacles in realization of IPA projects and "lessons learned" will be illustrated by the analysis of the non-eligible costs which occurred in all type of projects (PJR, 2014). It is reasonable to expect that the similar problems related to non-eligible costs can be encountered by projects implemented within ESIF.

The analysis showed that **most of the non-eligible costs** are related to salaries (58.7%), unjustified budget overruns (42.7%), public procurement (23.9%), non-eligible outputs (13.7%), administrative costs (12.3%) and travel expenses (12.4%). Exchange rate losses, origin of goods, VAT, etc. make a smaller part of non-eligible costs. While non-eligible costs related to salaries request further specific analyses since there are no rational reasons for them, the unjustified budget overruns and public procurement are often related to different interpretations by the beneficiary and the contracting authority whereby more than 50% of beneficiaries in the sample claim that these decisions of the contracting authority on ineligible costs were unfounded. Frequent occurrence of ineligible costs suggests a need for more standardized grant and project agreements which will minimize the arbitrariness and uncertainties of users and contracting bodies. It is necessary within ESIF to clearly state the rights and obligations of both parties and make users completely familiar with the rules of the projects implementations.

The users themselves believe that the success of their projects will be improved by educational workshops and technical assistance concerning the /1/ project management and implementation (82%), /2/ public procurement (57.9%), and /3/ project preparation (39.8%).

Other factors that prevent the efficient use of EU funds are related to the lack of professional administrative staff since the number of people working on EU-funded projects does not increase despite growing needs and demand. Fluctuation of administrative staff results in lack of experience and expertise, which hinders creation of high-quality project management and well-written projects (Tolušić et al. 2013).

4 PUSH – PULL FACTORS FOR R&I PERFORMERS TO PARTICIPATE IN FP7/H2020

There are many personal and subjective motivating factors for participations of R&I performers in H2020 such as scientific prestige, participation in creation of the world science, acquisition and creation of new knowledge, international recognition and networking, additional income, etc. However, the new and more down-to-earth circumstances initiated by science policy have been developed in Croatia within the reform of R&I system since the mid-2013 which orient researchers towards H2020, as follows:

- The serious budget cuts and limitation to only one national fund for basic research (CSF) force researchers to find new or additional resources for research grants to secure operational costs and mobility;
- The re-accreditation process of research institutions (as a part of research quality system) forces many public institutes to make strategies and action plans which incorporate measurable actions for more intensive participation (or at least efforts) of researchers in H2020, as well as in other international projects;
- The new rules for career progress which move the process of election of researchers to research posts from MSES to individual research institutions, enable the institutions to condition the election into the higher posts with a stronger engagement in H2020 (and other international) projects; this intention is a direct consequence of evaluation criteria for re-accreditation of research institutions.

The main **demotivating factor**, which stems from EU policy to increase scientific excellence through competitiveness, relates to a small acceptance rate of project proposals within FP/H2020 in relation to invested efforts (Švarc et al., 2012). Other demotivating factors include overload of researchers with other research or educational activities, sense of scientific inferiority in comparison to more competitive research groups, lack of international connections, networking and integration needed for engagement in the H2020 projects and feeling that application on H2020 is simply hopeless and therefore irrational.

Some features of the Croatian participation in FP/H2020 have been analysed in the previous research (Mataković and Radočaj Novak, 2013), and **obstacles** for more intensive participation in H2020 were pinpointed, as follows:

- Regional and institutional disparities of participants, i.e. **spatial and institutional concentration of participants** in more developed regions and in research stronger and larger institutions;
- **Small number of projects coordinated by Croatian participants** (around 12% or 31 out of 248 in FP7); these projects are without international consortium, and the coordinators are mostly the only participants;
- **Small number of participants in projects focused on scientific excellence** (e.g. Cooperation in FP – around 45% of all projects) in comparison to other programmes such as Capacities, Support actions, etc.
- Unsatisfactory and **declining success rate within H2020** in the number of projects granted and especially in EC financial contribution.

These features reveal that most critical barrier for Croatian researchers to participate more intensively in FP/H2020 is the **lack of skills and capacities for managing and coordination of EU projects according to the rules and procedures of the EC** at the level of research institutions and individual level of researchers (Švarc et al, 2012).

Majority of researchers face the difficulties not only in management of projects and financial matters but also in finding appropriate calls and research partners. The assistance provided by the NCP is not sufficient, while research institutions, with some exceptions, are not able to provide professional advisory support to researchers in project management and financing. Therefore, researchers are mainly left alone in their participation in FP/H2020 projects and force to behave according to “learning by doing” scheme.

EU projects have become large or very large projects with many partners organised in consortiums. They require increasingly complex and sophisticated management skills and knowledge which late-comers can hardly acquire and catch up with competitors from scientifically more advanced countries.

One of the path-dependent factors, which today have a discouraging effect, is a long-term exclusion of Croatia from the full membership in FP which has caused the **effect of the “late entry”** evidenced by the delay in gaining experience in the participation in the FP and corresponding gaps in acquiring of project management skills and building the national management structures in comparison to other member states. In Croatia, there are few large research organizations such as Ruđer Bošković Institute, Faculty of Electrical Engineering and Computing (at the University of Zagreb) or University of Rijeka which acquired managing capacities (mainly owing to coordination of projects within REGPOT and similar research supporting programmes) and have developed recently their own offices for EU and international projects. Since they are also large institutions with significant human capacities in R&I, they are more prepared for the competition within H2020 than smaller research organisations.

Most of the Croatian participants in the FP7 are research institutions located in the capital city of Zagreb. Zagreb University absorbed 80% of all FP funds for universities and provided 80 out of 104 participants. It is followed by the School of Medicine of the University of Rijeka (the latter also received around €24m for research infrastructure from SF 2007-2013 while the four smaller universities in Croatia (Dubrovnik, Osijek, Pula and Zadar) had a total of only two participants. In the domain of research institutes, the RBI provides 60% of participants and absorbed around 95% of funds (Mataković and Radočaj Novak, 2013). It illustrates that concentration of research resources in term of human capital, equipment, large infrastructure as well as in project management capacities through accumulation of practical experience and skills are the most critical factors for success in EU projects⁸.

Since the majority of research organisations still suffer from a lack of capacity to manage and administer FP projects their success in H2020 mainly **depends on the success of their project coordinators**. It could be stated that the Croatian participants are as good as the good are their coordinators. Therefore, well established international networking with a focus on the competent research organisations and successful applicants to the FP/H2020 projects is the most critical factor for Croatian research institutions to be successful participants in H2020. At the end of the day it distinguishes successful from non-successful participants. Main coordinators of projects with Croatian participant are coming from the United Kingdom, Germany, Italy, Spain and France, which is not surprising since these countries have the largest number of participants in FP7. The institutional or company culture collected through active collaboration and experience is an important factor in successful participation in H2020. Since accumulation of the skills, knowledge and experience is critical in this process, there is a risk that a small number of research organizations or groups continue to be successful in winning project grants and in further accumulation of experience, while the vast majority remain on the margins of EU cooperation. Although it may look good from the point of view of sharpening scientific competitiveness and excellence, on the whole, it could weaken the overall

⁸ Similar effect is observable also among the companies, since the company Novamina- Center for innovative technologies in eco-engineering participated in 18 projects alone while the two closest companies participated in five projects each (Mataković and Radočaj Novak, 2013)

scientific system and national knowledge base, which is already modest in terms of the number of researchers and investments.

On the other hand, it is also true that the Croatian scientific community is somewhat inert and that many researchers and research group are not internationally competitive and lag in scientific knowledge, advances and competences. Because of that, they are lacking skills for elaboration of research subject in the manner required by the EC. There is also a tension between the research topics determined by H2020 and research relevant for Croatia or driven by the broader social or national interest which do not fit into the H2020 scheme.

5 POLICY INSTRUMENTS FACILITATING THE PARTICIPATION IN (FP7) H2020 / (SF) ESIF

Building up of the administrative capacities intensified in 2007/2008 due to the increased participation in FP6. The activities include establishment of the network of NCPs, network of research managers at universities and major scientific research institutes, organization of workshops, info days and seminars.

A new **policy incentive measures** were launched in September 2008 by the MSES which made a Decision on the activities of the FP7 by which the MSES co-financed the costs of preparing positively evaluated FP7 projects. It also introduced a financial reward for scientific excellence of contracted FP7 projects in which the Croatian partner received funds with more than EUR 100,000.00. Unfortunately, due to the economic crisis this Decision was repealed already in June 2009. Presently, there are no such incentive policy measures for participation in H2020.

The main responsible government institution is the MSES, which provides the overall policy framework for participation in the H2020, and the Agency for Mobility and EU programmes (AMPEU), which has taken over certain duties since 2009, i.e. nomination of the national contact persons (NCPs) and for implementation of some parts of sub-programmes Cooperation (Cooperation). Six full-time employees in AMEUP work solely on H2020.

NCP network⁹ is organised and coordinated by the MSES. There are 22 thematic networks within the overall NCP system and four institutions are involved:

1. Ministry of Science, Education and Sports (2 NCPs) – National NCP coordinator, ERC NCP and FET and Research Infrastructure NCP;
2. Agency for Mobility and EU Programmes – (9 NCPs) two of them responsible for legal and financial issues
3. Croatian Agency for SMEs, Innovations and Investments -HAMAG-BICRO – (2 NCPs) SME Instrument and Access to Finance
4. State Office for Radiological and Nuclear Safety – 1 NCP for EURATOM.

NCPs provide the following type of expertise: expertise of EU RTD activities, knowing how the EU FP works: rules for participation, calls for proposals, evaluation and selection, project proposal preparation, contracting (model contract), IPR and other legal and financial issues, project management, understanding research & innovation, knowing the national research landscape etc.

Some NCPs have practical experience in academic or industrial research. NCPs perform the following activities:

- Support throughout the project cycle (project preparation, application / evaluation, project implementation);
- Help in the search for partners to participate in projects;
- Presentations of a potential Croatian partners abroad;
- Help about financial and legal inquiries;
- Organization of information days, workshops, roundtables, conferences focusing on the H2020;
- Information and awareness raising activities (circulate general and specific information such as calls for proposals, possibilities and rules for participation);
- Advising, assisting, and training on administrative & contractual issues, responsibilities of partners, costs, rights & obligations in consortium, IPR...
- Consulting – telephone, email or personal onsite consulting services;
- Communication with the Commission representatives – via functional mailbox or give feedback to the Commission;

⁹ <http://www.obzor2020.hr/obzor2020-kontakt> (Last access 9/6/2015)

- Participating in Programme Committee (some of them) and NCPs projects;
- Updating of the national website of H2020;
- Networking – on national and international level of the Croatian partners.

By contrast to many training, information and consulting activities related to FP/H2020, these activities regarding ESIF are rather scarce.

Opinions about the effectiveness and efficiency of NCP support are not harmonised. While some researchers are very satisfied with the information and assistance and regular communication provided by NCPs, other are less satisfied with their assistance related to concrete problems mainly due to the fact that majority of NCPs have never participated in or coordinated a research project, so their practical experience is limited. There are also opinions that NCPs are overloaded by administrative and organizational activities and obligations, rather than working in the field, closely communicating and cooperating with researchers, and supporting staff and top-managers. Within the last 5 years, a high fluctuation of NCPs has been an issue of great concern.

NCPs mainly attend relevant meetings related to H2020 calls and consequently share the information to the relevant community. However, regarding synergy of the projects and funds, NCPs are not sufficiently informed, trained or educated neither by the European Commission nor by the management authorities. NCPs should be better trained to provide information and assistance on the synergies between the EU framework programs and the ESIF. In the previous FP7 mainly Regional NCPs were aware of the importance of synergy between the different funding sources. Moreover, given the low involvement of Croatian officials, researchers and experts into wider EU policy circles, NCPs have restricted access to informal networks of knowledge sharing and, therefore, to best practices and pragmatic solutions to specific issues.

So far, there have been few workshops or events which tackled synergies between ESIF and H2020 (in particular based on concrete examples) for NCPs or other relevant stakeholders.

Some large research organisations and universities (RBI, UNIZG, UNIRI) have established their own offices for EU projects and international cooperation. Many faculties and public institutes established offices for international cooperation, scientific managers and LEARs who are in varying degree engaged in assistance for H2020. By contrast to offices for EU cooperation which are able to provide technical assistance to researchers regarding project application, management, financing, and many other difficulties which arise in practice, scientific managers are mostly not able to provide this expert and demanding information on how to manage projects according to EU rules. Management capacities are simply not developed enough at the level of research institutions to provide efficient assistance to researchers for participation in H2020 which make them to participate in the projects following the “learning by doing” principle. In a better position are researchers who can exchange information with the colleagues who also participate on FP/H2020 projects which again illustrates the importance of accumulation of knowledge and experience.

Some research managers and some faculties' offices for international cooperation invest efforts to:

- Constantly and timely inform their researchers (e-mail, personal contacts, meetings) about any funding opportunities (in case of H2020 and ESIF: firstly about the working program 2014-2015 and/or ESIF operational programmes, then about concrete open calls, then about application and evaluation procedures)
- Organize informational, educational and capacity building workshops (internal workshops for faculty researchers and open workshops for university researchers and external stakeholders from public, private and civic sector) on funding opportunities and application procedures aiming to raise awareness and increasing motivation to participate in open calls.

Researchers regularly receive invitation for training and capacity building activities from local consultancies, as well as companies from foreign countries but few can afford them or are interested in them. In some cases, the quality of such trainings is also an issue.

One of the instruments that could facilitate participation in H2020/ESIF projects could be the setting up of easily available and retrievable database(s) with detailed overview of all projects and participants in H2020/ESIF (FP/IPA), which would inform researchers about participation of others and challenge them to participate by themselves. The database could also serve for evaluation purposes.

6 EVALUATION AND MONITORING MECHANISMS

Croatia has relatively little experience with SF/ESIF funding schemes since it joined the EU in mid-2013, before which Croatian applicants had limited access to EU funding, primarily through IPA programme. Ex-ante and interim evaluations of IPA components were performed and monitoring took place during the implementation of IPA. Ex-post evaluations are still in progress. In the case of Operational Programme Regional Competitiveness 2007 – 2013, within which R&D-related activities were supported, the final ex-post evaluation was scheduled for the fourth quarter of 2015 (MRDEUF, 2013). However, the results of evaluation are rarely widely shared, and their impact on future activities and practices is uncertain.

Several public calls for funding under ESIF have been published since Croatia became the 28th EU member state. Some novelties have been introduced compared to schemes funded from IPA or national resources, primarily when it comes to transparency of the overall selection process. Namely, drafts of public calls became a subject to public consultation process, and implementing bodies analyse all received comments and proposals and publish their responses to each individual comment/proposal. Administrative requirements for applicants have been somewhat reduced, but these are still relatively complicated and often can be considered unnecessary.

Since Croatia gained access to SF/ESIF, several public calls have been published, out of which only one in the area of R&I – Strengthening capacities for research, development and innovation, a grant scheme funded from ERDF under Operational Programme Regional Competitiveness 2007-2013, implemented by the Ministry of Science, Education and Sports (MSES). Selection of project proposals is a process organised through five main steps, which include:

- Reception and registration of proposals (performed by MSES);
- Administrative check (performed by MSES);
- Project selection based on selection criteria (performed by MSES);
- Eligibility check (performed by Central Finance and Contracting Agency – CFCA)
- Financing decision (MSES).

Within the public call, it was announced that MSES will establish the Committee for project selection. However, there is no available data on the criteria the Committee members need to fulfil in order to join the Committee and participate in project selection process. The Committee can evaluate project proposals on its own, but has the right to entrust the selection to independent reviewers. In the case that independent reviewers have been engaged, the Committee needs to confirm their decisions. If the Committee considers that selection procedure was not comprehensive enough or fair, transparent, or suspects that any kind of technical or procedural error has occurred, it can propose new project evaluation, or re-evaluate the proposal itself. However, there is no rule or the obligation that the implementing body (in the case of this public call – MSES), should implement international peer review principles or even engage proven experts in the evaluation process.

The criteria for projects' selection are defined by the Decision on the objectives, conditions and procedures for granting state aid for research and development¹⁰ adopted by the Ministry of Science, Education and Sports in December 2013 and related Evaluation criteria¹¹ which are an integral part of the call. The evaluation criteria include, besides the administrative requirements, five groups of evaluation indicators: relevance of the project, management capacities, sustainability of the project, value added and risk assessment.

This call, as well as others, has also been characterised by several revisions of the public call text and documents. Some of the changes, for example, include revised list of eligible costs, co-financing rules and required documentation as a part of project application, contract proposal, and even a business plan template. Unfortunately, this practice cannot be considered as an exception related to this specific public call, but has become a practice in almost all public calls for ESIF funding applications.

In the period 2007-2013, Croatia had access to IPA funding, through which Croatian authorities and beneficiaries have developed their capacities for absorption of EU funding and gained experience in programming and project development. However, no comprehensive analysis has been performed in order to assess the overall efficiency of the system or the success of projects which received funding during the period 2007-2013.

¹⁰ <http://www.strukturnifondovi.hr/sites/strukturnifondovi.hr/files/cr-collections/4/odlukaociljevimaupvjetimaipostupcimazadodjeljivanjedravnepotporezaistraivanjeirazvoj-1394125485.pdf> (Last access: 9/6/2015)

¹¹ [file:///C:/Users/%C5%A0varc/Downloads/Prilog_4_Kriteriji%20\(1\).pdf](file:///C:/Users/%C5%A0varc/Downloads/Prilog_4_Kriteriji%20(1).pdf) (Last access: 9/6/2015)

Research on EU-funded projects which have been implemented in Croatia in the period 2007-2013 has been conducted by a private consulting company on the sample of 576 grant contracts awarded through 37 grant schemes (PJR, 2014). Despite using a convenience sample, the analysis offers some indicative evidence related to the several main problems which influence the success of funded projects, as well as the absorption of EU funding in Croatia. These include:

- Focus on project activities rather than achievement of planned results within the IPA-funded programmes, which reduces the possibility of efficient evaluation of the achievement of the goals and results of individual programmes / public calls.
- Achievement of results amounted to more than 95%. However, number of projects in which results have been fully retained is about 50%, which indicates the need for modification of the existing programmes.
- About 60% of beneficiaries have used external evaluation, which indicates a relative lack of awareness on the importance of project evaluations, especially when it comes to public sector organisations.
- Average duration of the process from project application to contracting was 14.5 months, which is significantly above the maximum period of 9 months, prescribed by the EU Financial Regulation for the period 2014-2020. Therefore, Croatian authorities should significantly improve their evaluation procedures and capacities to ensure efficient absorption of EU funding and project implementation.
- On administrative project implementation beneficiaries have spent around 1.8 months more time than they have initially anticipated. Authors of the research have concluded that the main reason are complex administrative requirements, and additional administrative requirements of contracting bodies which have not been planned during project preparation phase, as well as lack of knowledge and experience of beneficiaries.
- Administrative burdens are additionally increased through the obligation of quarterly reporting, which does not serve as a basis for approval of results, outputs or payments. Average time for approval of quarterly reports is 3.23 months, which indicates that beneficiaries are required to submit the new report before the last report has been approved. This way, beneficiaries do not have the information whether previously reported expenses have been approved as eligible, or there is a need to report these in the new report, which further increases uncertainty and administrative burdens for beneficiaries.

In addition, approval of interim reports exceeds maximum deadlines for 45 days on average, while the deadlines for approval of final project reports are exceeded by 8 months on average. Only 2.23% of reports have been approved without the request of authorities for further corrections.

These results point out extremely low evaluation efficiency of national authorities, as well as high, and often unnecessary, administrative burdens of the overall implementation process of EU-funded projects.

- Payment deadlines based on interim reports have been respected or minimally exceeded. However, payment deadlines based on final reports have been prolonged between 1.86 and 2.36 months on average. Consequently, payment delays influence the business success of beneficiaries, raise additional expenses for national budget through interest payments, as well as threaten the absorption of EU funds, considering the deadlines set by the EU regulations.
- In the cases where some of the costs have been discarded as non-eligible, around 55% of beneficiaries consider that the decision of contracting authorities proclaiming a part of costs as non-eligible has been unjustified. This indicated the need to develop standard grant agreements which would minimise the possibility of arbitrariness of both beneficiaries and contracting authorities, primarily through clearly and comprehensively stating all the rights and obligations of contracting parties.

To sum up, evaluation and monitoring mechanisms, regardless on the source of funding (national or SF/ESIF), still require improvements, especially when it comes to efficiency, appropriateness and transparency. Although some improvements have been made, selection criteria for some public calls have remained generic and only vaguely correspond to programme goals,

which makes project applications more difficult to prepare and selection process more dependent on evaluators' subjective appraisal. In some cases, project evaluation is based on specific indicators that should be estimated within the project proposal. However, these are sometimes quite difficult to assess with any certainty (e.g. increase of revenues from export within the grant scheme for SMEs under the Ministry of Entrepreneurship and Crafts, funded from ERDF), leaving beneficiaries in the position to estimate these indicators optimistically to ensure successful project application, which could raise significant problems during evaluation of projects after their implementation.

Administrative requirements applicants are required to fulfil are still complex and their actual purpose is sometimes difficult to recognise. For example, project applications often need to be delivered in two or more hard copies and in electronic form, while applicants need to collect extensive documentation which contains data easily available on-line (e.g. commercial court excerpt, excerpt from the register of scientific organisations managed by the MSES, etc.). Guidelines for applicants often contain unclear provisions which can be interpreted in different ways, and in some cases even contact persons of relevant authorities cannot provide correct information on specific provisions of the call. This indicates insufficient knowledge and competences of administration on relevant rules and procedures, which causes significant problems for project applicants who apply for funding from national or EU funds.

There is also a problem of low coordination levels between relevant authorities included in the programming and evaluation process, which is further emphasised through provision of mutually contrary, insufficient and sometimes even incorrect information on project preparation and implementation procedures to applicants and their consultants, especially when it comes to ESIF procedures.

When it comes to ESIF, Evaluation Strategy for European Structural Instruments was defined in 2012 (cf. MRDEUF, 2012). It was designed as a tool which will, using good practices and lessons learned in previous years, facilitate the transition from IPA to ESIF. The overall objective of the Evaluation Strategy is to improve the effectiveness, efficiency and sustainability EU assistance under the Structural Funds and the Cohesion Fund after accession. The specific objectives of the Strategy include a) improving the capacity of Croatian authorities for contracting, management and use of evaluation SF/ESIF intervention; b) ensuring systematic and consistent application of evaluation throughout the entire implementation of SF/ESIF and c) including evaluation results in decision-making processes for the implementation of SF/ESIF in Croatia. Although various activities are implemented, there is no available information about the developments related to the achievement of the objectives of the Evaluation Strategy.

Significant improvements should be invested in increasing the capacities and knowledge of relevant authorities in the area of specific rules and procedures relevant for ESIF, programming and preparation of public calls, as well as in evaluation of project proposals and implementation of selected projects. Communication between authorities and beneficiaries also requires improvements, with the aim of developing transparent and efficient project preparation and implementation process.

Project applicants often need to engage consultants for development of successful applications, given the complexity of required documentation (feasibility studies, technical documentation, business plans, budgets, etc.). The domestic consulting sector is developing and subsidiaries of many major EU consulting companies also operate in Croatia. Despite occasional challenges and some doubts about the work of particular companies or experts, the role of the consulting sector is broadly positive, but knowledgeable project applicant have also become aware that even when consultants are engaged, the project team within the organisation also needs to be actively engaged.

7 ENHANCING OR LIMITING THE SYNERGIES?

The synergy of H2020 and ESIF projects and funds is largely uncharted area in Croatia and there is a difficulty to identify projects which combine different funding schemes. Instead, there is a need to sensitise both policy makers and beneficiaries about the potential of combining different financing sources for the same projects or for related projects. The transparent information/advisory services on funding options are needed as well. The managing authorities and implementation bodies for ESIF and H2020 should share knowledge, plan joint communication efforts, coordinate criteria and timing of calls for project proposals that can generate synergies. There is also a suggestion for setting up an interdepartmental committee responsible for coordination of policies and measures in order to support the synergies.

As for the synergies in the previous period, it can be stated that the most synergies were realized between the projects funded by the Unity through Knowledge Fund (UKF) with the FP and the business sphere. The performance indicators show that the beneficiaries of the Fund managed to attract additional €8.7m from FP and €1.8m from the business sector on top of the initial investments of €4.8m in the period 2007-2012. UKF was co-financed by the STP and is temporarily suspended. Due to a lack of synergy among projects and funds the obstacles to synergy such as bureaucratic burdens, the special eligibility criteria, evaluation procedures or other administrative obstacles which would prevent the synergy are not identified.

However, the combination of funds seeks greater efforts than mere removing administrative obstacles because strategic goals of H2020 (scientific excellence) and ESIF (industrial/business application and commercialization) are quite different. There is possibility that H2020 funded projects do not have a lot in common with the ESIF projects focused on local business development. In any case the success of **synergy will depend to a great deal to the realisation of ESIF programmes as a part of funding cycle** (sequential parallel, alternative or cumulated). Therefore it is necessary to **secure smooth development and implementation of ESIF projects**.

ESIF provides significant funds but favours complex projects with larger research groups with experience in partnership with enterprises. In the same manner, the combination of H2020 and ESIF requires more coordination among stakeholders, greater experience in the project application and the greater capacity to absorb funds. These requirements present a difficulty for a significant portion of the **research community which is internally fragmented and disintegrated as well as externally disconnected from the business sphere**.

Public stakeholders should find a way how to mobilize a larger number of researchers from different disciplines to participate in the ESIF, i.e. to mobilize those researchers who are now discouraged to participate in ESIF due to lack of resources in terms of a size of research teams and collaboration with industry. The main challenge is how a fragmented research community integrates internally-within research community, and externally – with the business sphere.

In this context the main challenges for the administration and public stakeholders for successful use of ESIF involve:

- consolidation of research groups and concentration of research resources with the aim of their productive use for economic development;
- implementation of the active policy measures and mechanisms for involvement of the entrepreneurial discovery process¹² which is presently left to quite spontaneous initiatives of both the researchers and companies; they do not necessary involve the technologies and research which could contribute the most to local development and which follow S3 priorities.

Consolidation of research groups had already partially started with the establishment of the first seven centres of scientific excellence and the new project cycles funded by CSF aimed at larger and cooperative projects, both started in 2014. However, these actions involve a relatively small number of researchers while most researchers are lacking projects grants and face difficulties to finance basic operational costs of scientific work. At the same time they make relatively untapped potential with relatively high quality research competences for participation in the ESIF projects. They should be put into work following the entrepreneurial discovery process.

However, the consolidation of research groups, and especially their cooperation with the business partners will not occur, very probably, spontaneously because effort to create cooperative and complex projects with more stakeholders are rather labour and time consuming. By contrast, the possibility to win the grants are very uncertain (or still the success rate is unknown).

There is also a **risk that the ESIF** will be used mainly by the PROs and HEIs which have already established cooperation with industry (these are typically strong research institutions that absorb most of FP/H2020 funds). It is likely that their capabilities will be further strengthened, while the capabilities of others may weaken (similar to the participation in the FP/H2020). The same goes for the business sector and local government units (LGU) since smaller companies and LGU (counties, municipalities, and cities) do not have management and human resource capacities for applying to more ambitious ESIF projects.

Public administration on both the state and regional/local level will need to put in much more efforts in the successful realisation of ESIF which will eventually result in greater synergies among the funds and projects. **Instead of the current passive and formalized procedures** for programmes' implementation (a sequence of call-application-evaluation-implementation), **public stakeholders need to actively participate in the creation of projects** to secure sufficient number of high quality projects which are useful for the local or regional development. The principle of entrepreneurial

¹² This is a concept that suggests that entrepreneurs and public stakeholders should explore and learn together what should be done in the field of R&I to build competitive advantage of a certain regional or local economy in line with the S3 and identified priorities.

discovery process and following priority areas defined by the S3 requires much more **coordination and guiding actions** and requires administration to take a more active role. Coordination and guiding actions assumes effective **communication and an exchange of information** regarding strategic plans and implementation of operations between involved managing authorities of the ESIF, ministries, agencies, contracting bodies, the regional and local authorities and other stakeholders. **The broad range of SMEs should be involved in the process** as the key actors of entrepreneurial discovery process and a key partners to research organisations. Up to now, SMEs have often been "under the radar" of research organisations (which are typically large) looking for partners from the business sector (typically large companies). Since the number of large companies is rather exhausted, there is a need to involve SMEs more intensively. It is worth mentioning that some analyses reveal (cf. MEC, 2013) that the Croatian medium sized companies invest more in R&I than European companies on average. **The linkages between SMEs and research organisations will be a key mechanism for the success of the Priority axis 1 of the OPCC** which should be realised with ESIF. However, the Managing bodies of the level 1 in the PA 1 are only MSES and MoE while the line ministry for SMEs – **the Ministry of Entrepreneurship and Crafts (MEC) is not planned as a stakeholder** in the realization of the PA 1. Therefore, it is not clear how connections between SMEs and research sectors will be encouraged and established by the state strategy and a policy point of view.

One of the possibilities to create greater synergies among projects, funds and researchers is a launch of the calls that would ask for the solutions of specific local/regional/national challenges instead of the present thematic-oriented calls. Solution oriented calls have potential to better follow the entrepreneurial discovery process, to involve stronger the key technologies/priority areas determined by S3 and to synchronize S3 with the Priority axis 1 of the OPCC. It should be taken into account that absorption of ESIF is not only the job of the central government; important roles are played by local authorities, utility companies, civil society organisations, etc.

A possible starting point might be **project ideas that have been collected by the regional agencies in the process of elaboration of regional development strategies at the county level**. Although these ideas vary in the quality and feasibility, many of them can still be used and/or further developed into projects. Moreover, companies which participated successfully in the FP/H2020 can be potentially good partners in ESIF projects.

The challenges – oriented calls would possibly create the conditions for identification and realization of the concrete projects that would solve the actual problems of LGU and companies using research capacities, key enabling technologies and by fostering stronger links between researchers, companies, local public administration, civil society organisations, and other stakeholders. Such a process is based on the **participatory principle of developing projects** in which each stakeholder will learn how to take part in ESIF projects. An example of good practice is a Government's Office for Cooperation with NGO¹³ which developed a developed Strategy for CSO development until 2020 and funding schemes for CSOs and succeeded to absorb around 90% of allocated resources within IPA. Such a participatory process is demanding and complex and should be supported by clear mandate and financial resources. The lack of culture for cooperation and communication among the stakeholders and a lack of experts who are capable of strategic and analytical thinking could put this process at risk.

The analysis of the organizational capabilities of LGU performed by Mičetić-Fabić (2012), revealed that the largest obstacles for the implementation of EU projects in the LGU (counties, cities, municipalities) include **lack of human resources to work on projects, insufficient resources for project co-financing and a lack of experience in project-type work**. Other obstacles also involve a lack of an adequate system of remuneration, motivation to work on EU projects, inadequate hierarchical organisation of work, fears due to inexperience in working on EU projects, work overload, English language deficiencies, etc.

MRDEUF estimates¹⁴ that administrative staff related to ESIF currently accounts for about a thousand persons distributed in 27 state institutions. It is estimated that it is not enough considering that the opportunities for financing of projects from EU funds in the period from Croatian accession to the EU, increased eight times compared to the pre-accession period. In 2015 it is planned to employ about 350 new administrative employees at the level of the central state involved in the management and control of the use of ESIF. However, the key untapped potential related to ESIF and H2020 absorption is at the level of specific public, private and civil sector organisations across the country, which should increase their capabilities and foster stronger linkages that will lead to projects and synergies.

¹³ <http://www.uzuvrh.hr/defaulteng.aspx> (Last access: 9/6/2015)

¹⁴ <http://www.jutarnji.hr/nova-radna-mjesta-u-administraciji-za-eu-fondove/1240795/> (Last access: 9/6/2015)

8 TAKE-UP OF PUBLIC SECTOR RESEARCH RESULTS

Policy instruments designed to promote the take-up of public sector research results by the private sector are still rather scarce in Croatia. There are several programmes aimed at facilitating R&I commercialisation and cooperation between public research organisations and industry, which are currently implemented within the Business Impulse programme. The programme is managed by the Ministry of Entrepreneurship and Crafts and HAMAG-BICRO and is primarily oriented at increasing competitiveness of small businesses and crafts, but also supports innovative entrepreneurship.

In 2015, programmes IRCRO, RAZUM and PoC are implemented under the Business Impulse programme. IRCRO programme aims at encouraging SMEs to establish R&D activities and cooperate with public research organisations. The programme was designed to stimulate the demand for services of public research institutions and to encourage private sector (SMEs) to invest in R&D activities. The RAZUM programme supports commercialisation of products and services developed as the result of R&D activities, through funding of technology oriented knowledge-based start-ups and SMEs. Funds are used for development of projects in pre-commercial stage. Evaluation of commercial projects is also conducted through RAZUM, but source of funds for these projects was Croatian Bank for Reconstruction and Development (HBOR). The PoC programme was created to ensure pre-commercial funding for technical and commercial testing of innovation concepts. So far, PoC has achieved significant results in terms of the number and quality of applications and funded projects. Its evaluation procedures are transparent and effective, which is one of the reason for the continuous increase in the number of applications.

Science and Innovation Investment Fund (SIIF) was a project implemented by MSES and funded through EU IPA IIIc. The project supports technology transfer and commercialisation of universities' research results. SIIF has been divided in two phases. Within the first phase, five projects received funding of €5million, while the second phase, with 19 more projects, has been planned to end in 2015.

In February 2015, HAMAG-BICRO launched Technology Transfer Office Support Programme within the World Bank's Science and Technology Project II. One of its goals is to provide support to technology transfer offices in the process of creation of university spin-offs, which should result in more efficient transfer of public sector research results in the private sector.

Clusters are being increasingly recognised as a mean to develop cooperation based on tripe-helix approach. Over the last few years, financial support has been provided to cluster initiatives also through the Business Impulse Programme, however with limited results in development of sustainable innovation linkages. Ministry of Economy initiated establishment of 12 competitiveness clusters based on top-down approach in 2013. These clusters are focused on specific sectors and are expected to include a wide scope of activities aimed at development of competitiveness in Croatia.

Several new grant schemes have been prepared (or are being prepared) by the Ministry of Economy, Ministry of Science, Education and Sports and Ministry of Entrepreneurship and Crafts, which should provide support for the innovation development and commercialisation process, from technology transfer and proof of concept projects to different R&D projects implemented by SMEs and larger companies. Ministry of Economy is preparing a grant scheme for establishment of centres of competences, providing financial support for development of innovation infrastructure and costs of specific R&D projects that should be developed in established centres of competences. Centres of competences will be required to prove the support of at least one national competitiveness cluster, which should also activate the role of 12 competitiveness clusters in innovation development.

Using public procurement for facilitating innovation development is not a practice in Croatia. Public procurement procedures are based on the Public Procurement Act, which does not distinguish innovative goods and services from other goods and services. However, development of specific procurement procedures to foster innovation is planned within the Strategy for Innovation Encouragement of the Republic of Croatia 2014-2020. The Strategy has been adopted in December 2014, but no specific measures have been developed or entered into force so far.

The need for enabling effective transfer of research results from public into private sector has been recognised at national level and included in all relevant strategic document that have been developed since 2014, including Strategy for Innovation Encouragement of the Republic of Croatia 2014-2020, Strategy for Education, Science and Technology and Industrial Strategy 2014-2020, which emphasise the need for development of innovation linkages in Croatia.

9 COUNTRY TAILORED POLICY SUGGESTIONS

This section provides an overview of policy suggestions for Croatia, clustered into recommendations for specific sectors.

In **research and innovation sector**, policies should be designed to **ensure the preservation of the national science base** and fundamental research in the public research sector in order to provide a basis for recruitment of excellent scientific groups and scientists. The current narrow base of H2020/ESIF projects cannot preserve the national science base. **Increase in the number of researchers, as well as investments in R&I in the business sector** should be further facilitated and encouraged through introduction of new and improved policy measures. **Science policy measures** should be maintained and further strengthened, especially when it comes to measures that take the involvement in EU projects as a criteria of scientific institutions performance and career progress of researchers. Comprehensive and transparent **system of scientific promotion, employment and career development** should be established in order to single out top scientists, with the emphasis on post-doctoral students, as a way of enabling their employment and development of their career in Croatia, rather than abroad.

Networking of researchers should be initiated to encourage perspective researchers and research organisations to participate in H2020/ESIF project applications, preferably through organisation of info days, brokerage events and similar measures. Funding necessary for successful **project applications development** (e.g. preparatory meetings) and **participation at international brokerage events** for identification of potential project partners should be ensured through introduction of new funding mechanisms, or widening the existing ones. In addition, **publication of public calls for project applications should be planned more carefully** to ensure that applicants have enough time to prepare successful project applications. Emphasis should also be put on finding solutions to **overcome the effect of late entry in FP/H2020 programmes**, especially when it comes to acquiring necessary skills in project management and financing through facilitating a more intensive participation of researchers in H2020 by creation of the common offices for EU projects, lobbying in the EU, exchange of experiences and best practices, etc. Further efforts should be invested in **regulation of land and property registers**, since unresolved property registration issues are a common obstacle in project applications of HEIs and PROs.

In order to facilitate greater participation of the **business sector** in ESIF, a comprehensive **evaluation of previous public calls** should be conducted, in order to eliminate unnecessary documentation required by the companies which hinders or slows down project application. **Public procurement procedures** in EU-funded projects should be improved, simplified and accelerated, possibly by using PRAG as a good practice example for improving national regulations. In addition, all procedures and **items associated with EU-funded projects should be treated as a priority** and resolved in a short notice. **Delays in final payments** should be eliminated through increasing the capacities and competencies of contracting authorities.

Public administration sector should be a subject of **analysis** in which all state administration departments in charge of the EU-funded projects should be identified and their functioning evaluated, in order to eliminate all overlaps in their obligations and to facilitate their communication and coordination. The analysis of the non-eligible costs on the IPA projects suggest that grant and **funding contracts** should be more standardized, determined and transparent in order to minimize the arbitrariness and uncertainty of users and contracting bodies regarding financial issues. The ESIF' beneficiaries should be well-educated and familiar with the rules of the project implementation than it was a case within IPA; the educational workshops and professional assistance are the most critical in project management and implementation, public procurement and project preparation. On the other hand, public administration should also be much better informed about the public calls and programmes they manage to provide correct and useful information to applicants and beneficiaries, as well as to avoid misinterpretation of relevant regulations.

Furthermore, it is recommended to develop easily available and retrievable **database(s) of all projects and participants in H2020/ESIF** (FP/IPA) projects for information and evaluation purposes.

When it comes to ESIF implementation in general, the need has been identified to sensitise both policy makers and beneficiaries about the potential of combining different sources of funding on the same project, as well as on the importance of the availability of transparent information/advisory services on funding opportunities. Managing authorities and implementation bodies for ESIF and H2020 should **jointly develop communication strategies and share the knowledge** between them. There is a suggestion for setting up an **interdepartmental body responsible for political and operational** strength of managing bodies to engage and support synergies adequately. Also, **NCPs should be better informed and trained** by the European Commission or national authorities on development of synergies between different projects and sources of funding, in order to enable them to provide project applicants with comprehensive assistance and timely information. Moreover, stronger involvement of Croatian officials, researchers and experts into wider EU policy circles should be encouraged, in order to access both formal and informal networks where knowledge and best practices are shared.

Public administration should find a way to **consolidate fragmented research resources** for the needs of ESIF projects: to integrate research community internally-within research community, and externally – with the business sphere to implement ESIF projects. All stakeholders on national, regional and local levels should participate more actively in creation of ESIF projects to secure the implementation of the principle of entrepreneurial discovery process and realisation S3 priority areas. This requires much more coordination and guiding actions as well as effective communication and an exchange of information regarding strategic plans and operational implementation between managing authorities, ministries, agencies, contracting bodies and other stakeholders.

The broad range of SMEs, which are currently “under the radar” of research organisations, should be encouraged to participate in ESIF projects as key actors of entrepreneurial discovery process and key partners of research organisations. In order to connect SMEs and research sectors, the MEC should be involved as a stakeholder in the realization of the PA 1 of OPCC.

There is also the suggestion to substitute present thematic-oriented calls by the solution-oriented calls aimed at dealing with the specific local/regional or national challenges. These types of calls might have better potential to follow the entrepreneurial discovery process, as well as to synchronize S3 with the Priority axis 1 of the OPCC. When it comes to project identification, a possible starting point might be the project ideas that have been collected by the regional agencies in the process of elaboration of regional development strategies at the county level. Although these ideas vary in the quality and feasibility, many of them can still be used and/or further developed into projects.

10 REGIONAL ANALYSIS

An overview of projects financed or approved by EU funds in the period 2007 – 2013 is provided on the [Structural Funds](#)¹⁵ web portal. The portal enables retrieving projects by operational programmes, type of EU funds (ERDF, CF, ESF), funding sectors (education, social inclusion, R&I, etc.), project location (counties, NUTS 2) and project status (ongoing, completed). However, the available data is not sufficient to enable more analytical approach or expert search to get a broader view and to pull out conclusions needed for policy making and strategies. Despite the shortcomings and questionable data accuracy, the database reveals a distinct difference in the number of projects implemented in Continental Croatia, compared to Adriatic Croatia which has significantly lower number of EU-funded projects.

The analysis of IPA projects (PJR, 2014) confirms that a significantly greater number of IPA projects, about 74.26% are contracted in Continental Croatia (Continental Croatia covers about 67% of the entire population). Accordingly, one can speak of a certain imbalance in the allocation of resources, and it is necessary to work on equal development of both regions.

¹⁵ List of beneficiaries within the Operational Programme Regional Competitiveness 2007- 2013 is also available here: http://www.mrrfeu.hr/UserDocsImages/EU%20fondovi/RCOP%202007-2013%20POPIS%20KORISNIKA%2008-2014_ENG.pdf

ABBREVIATIONS

AMPEU	Agency for Mobility and EU Programmes
CSF	Croatian Science Foundation
CSO	civil society organisations
FER	Faculty of Electrical Engineering and Computing
HAMAG-BICRO	Croatian Agency for SMEs, Innovations and Investments
IPA	Instrument for Pre-accession Assistance
MEC	Ministry of Entrepreneurship and Crafts
MoE	Ministry of Economy
MSES	Ministry of Science, Education and Sports
OPCC	Competitiveness and Cohesion Operational Programme 2014 - 2020
PA	Priority axis
PoC	Proof of Concept
RBI	Ruđer Bošković Institute
RIS3	Research and Innovation Strategy for Smart Specialisation
SIIF	Science and Innovation Investment Fund
STP	Science and Technology Project
UKF	Unity through Knowledge Fund
UNIRI	University of Rijeka
UNIZG	University of Zagreb

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